THE BLACK LINE

BLK-PTZ36X High Resolution 36x Zoom Outdoor PTZ Camera User Manual

Products: BLK-PTZ36X

Please read this manual before using your camera, and always follow the instructions for safety and proper use. Save this manual for future reference.

BLK-PTZ36X_CM
11/06/13

REGULATORY NOTICE

FCC Information

FCC compliance: This equipment has been tested and found to comply with the limits for a digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Conditions

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

CE

This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the Low Voltage Directive 2006/95/EC, the EMC Directive 2004/108/EC.

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Safety Warnings and Cautions

***Hazardous Voltage may be present**: Special measures and precautions must be taken when using this device. Some potentials (voltages) on the device may present a hazard to the user. This device should only be used by those with knowledge and training in working with these types of devices that contain live circuits.*

***Power Supply Hazardous Voltage**: AC voltages are present within the power supply assembly. This device must be connected to a UL approved, completely enclosed power supply, of the proper rated voltage and current. No user serviceable parts inside the power supply.*

***Connect only to a properly earth grounded outlet.** To avoid shock, ensure that all AC wiring is not exposed and that the earth grounding is maintained. Ensure that any equipment to which this device will be attached is also connected to properly wired grounded receptacles and are approved medical devices.*

***Power Connect and Disconnect**: The AC power supply cord is the main disconnect device to AC power. The socket outlet must be installed near the equipment and must be readily accessible.*
***Installation and Maintenance**: Do not connect/disconnect any cables to or perform installation/maintenance on this device during an electrical storm.*

***Power Cord Requirements**: The connector that plugs into the wall outlet must be a grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency in your region. The connector that plugs into the AC receptacle on the power supply must be an IEC 320, sheet C13, female connector. See the following website for more information http://kropla.com/electric2.htm.*

***Lithium Battery**: This device contains a Lithium Battery. There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the vendor's instructions and in accordance with local environmental regulations.*
***Perchlorate Material**: Special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate. This notice is required by California Code of Regulations, Title 22, Division 4.5, Chapter 33: Best Management Practices for Perchlorate Materials. This device includes a battery which contains perchlorate material.*

Management Practices for Perchlorate Materials. *This device includes a battery which contains perchlorate material.*
Electromagnetic Interference: *This equipment has not been tested for compliance with emissions limits of FCC and similar international regulations. This device is not, and may not be, offered for sale or lease, or sold, or leased until authorization from the United States FCC or its equivalent in other countries has been obtained. Use of this equipment in a residential location is prohibited. This equipment generates, uses and can radiate radio frequency energy which may result in harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is required to take measures to eliminate the interference or discontinue the use of this equipment.*

Warnings

- Use of the product only when in compliance with local electrical safety regulations.
- Use only the required power adapter. The standard power adapter is 24 Vac / 1.5 A.
- Do not connect additional devices to the power adapter. Doing so may over-heat the device and cause a fire hazard.
- Always make sure that the power adapter plug is fully inserted into the power socket.
- When the product is installed on a wall or ceiling, it must be securely attached.
- If the camera emits smoke, odors or noise power it off immediately and unplug the power cable. Contact the service center.
- If the camera does not work properly, please contact your dealer or the nearest service center. Never attempt to disassemble the camera yourself. (Your provider is not responsibility for problems caused by unauthorized repair or maintenance.)

Cautions

- Do not drop the dome or subject it to physical shock. Do not expose it to high levels of electromagnetic radiation.
- Do not install the camera on surfaces that are subject to vibrations or shock.
- Do not place the camera in extremely hot, cold (operating temperature range: -22 °F ~ 149 °F (-30 °C ~ +65°C)), dusty or damp locations. Fire or electrical shock can occur.
- Exposing the equipment to direct sunlight, low ventilation or heat sources such as heater or radiator should be avoided.
- Do not aim the camera at the sun or extra bright places. A blooming or smear may occur (which is not a malfunction however), and affect the longevity of CCD.
- Use the glove provided when opening the dome cover. Do not touch the dome cover; the acidic moisture on skin can erode the surface coating.
- Please use a soft and dry cloth when cleaning the inside and outside surfaces of the dome cover. Do not use alkaline detergents.

Preparation for Installation

- Basic requirements:
  - All the electronic operations must be compliant with local electrical safety regulations, fire prevention regulations and other related regulations.
  - Verify that all accessories are included with your shipment.
  - Make sure that the camera is suitable for the location and security requirements where it will be installed. If not, please contact the supplier.
  - Always use this product in accordance with the manufactures specifications and recommendations.
- Check installation space. Make sure the place have enough space to install the camera and its accessories.
- Check the intensity of conformation at the installation location. Please make sure that the ceilings or walls are strong enough to withstand four times the weight of camera and its accessories.
- Preparation of cables:
  - Choose video cable in accordance with the transmission distance. The video should meet the least demands as: 75 Ω resistance; 100% copper core conducting wire; 95% weaving copper shield.
  - For RS-485 communication cable, please refer to Appendix B.
  - For 24 Vac power cabling, please refer to Appendix C.
- Keep packaging for possible future use. If a failure occurs, return the product to the factory with the original packaging. Shipment without the original packaging may damage the product and incur additional costs.

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SECTION 1
Introduction

The BLACK Line™ 700 TVL 36x zoom outdoor PTZ camera enables you to pan, tilt and zoom in on suspicious activity within the area under observation and capture high resolution video of open spaces such as parking lots, shopping malls and sports facilities.

The BLACK PTZ camera features a 1/4" Sony® 960H CCD image sensor, 36x optical zoom, 16x digital zoom and delivers 700 TV lines of color resolution and 750 TV lines of black and white resolution for crisp, high resolution video. The PTZ camera is also equipped with enhanced imaging features such as digital wide dynamic range (DWDR) and 3D digital noise reduction (3D-DNR) to reduce video noise, as well as true day/night (ICR) to capture sharp detailed images 24 hours a day in both daytime and nighttime conditions.

The PTZ camera features 225 programmable presets, 8 patrols with up to 32 presets per patrol, selectable automatic gain control, plus a 360° endless pan range, -5° ~ 90° tilt range, 0.1°/s ~ 250°/s pan speed and 0.1°/s ~ 150°/s tilt speed. The PTZ camera has a very wide operating temperature range of -22 °F ~ 149 °F that makes it suitable for capturing video in cold climates, along with an IP66 weather-rated housing to withstand a variety of elements and environmental conditions. The PTZ camera also features privacy zone masking, 256x sense up and offers TVS 4,000 V lighting surge protection and voltage transient protection.

1.1 Features

OSD (on-screen display)

The on-screen display is a text image superimposed on video. The text displays status information and configuration menus.

Self-adaptive Protocol

The camera is compatible with PELCO-D, PELCO-P, PRIVATE-Code, etc., and is capable of being self-adaptive to these protocols.

Keyboard Control

The pan/tilt movement and zoom actions of camera can be controlled by the control keyboard, DVR, matrix, etc.

Limit Stops

The dome can be programmed to move within the limit stops (left/right, up/down) which are configurable by the control keyboard, DVR or client application software.

Scan Modes

The dome provides 5 scanning modes: pan scanning, tilt scanning, frame scanning, random scanning and panorama scanning. The scanning speed can be set by OSD menu from level 1 to 40, with the corresponding speed ranging from 1°/second to 40°/second.

Preset Freeze Frame

This feature freezes the scene on the monitor when moving to a preset. This allows for smooth transition from one preset scene to another and also guarantees that masked areas will not be revealed when moving to a preset.

Presets

Each of the user-definable presets can be programmed to use pan, tilt, camera settings and other settings. When a preset is called, the dome will automatically move to the defined position. The user can add, modify, delete and call each preset.

Label Display

The on-screen label azimuth/elevation, zoom and other operations can be setup by menus and displayed on the monitor.

Auto Flip

In manual tracking mode, when a target object moves directly beneath the dome, the dome will automatically rotate 180 degrees in the horizontal direction to maintain continuity of tracking.

Privacy Mask

The privacy mask allows the user to define areas of the field of view that cannot be seen by the operator of the camera. A masked area will move with pan and tilt functions and automatically adjust in size when the lens zoom changes.

Proportional Pan

Proportional pan automatically reduces or increases the pan and tilt speeds in proportion to the amount of zoom. At telephoto zoom settings, the pan and tilt speeds will be slower for a given amount of joystick deflection than at wide zoom settings. This keeps the image from moving too fast on the monitor when there is a large amount of zoom.

Auto Focus

Auto focus enables the camera to focus automatically to maintain clear video images.

DAY/NIGHT Auto-switch

The camera provides color images during the day. As light diminishes at night, it switches to night mode and delivers black and white images with high quality. You can also switch it to NIGHT mode manually to increase the sensitivity in low light conditions.

Wide Dynamic Range (WDR)

The wide dynamic range function helps the camera provide clear images even under back light conditions. When there are both very bright and very dark areas simultaneously in the field of view, WDR balances the brightness level of the entire image and provide clear image detail.

White Balance

White balance is the white rendition function of the camera to adjust the color temperature according to the environment automatically. It can remove the unrealistic color casts in the image.

Patrol

The camera provides up to 8 patrols. In each patrol, user is allowed to specify the scanning track by a group of user-defined presets, with the scanning speed between two presets and the dwell time at the preset separately programmable.

Pattern

A pattern is a memorized, repeating series of pan, tilt, zoom, and preset functions that can be recalled with a command from a controller or automatically by a configured function (alarm, park, time task, or power-up). By default the focus and iris are in auto status during the preset is being memorized.

Power-off Memory

This feature causes the dome to resume its previous position or status after power is restored. By default setting, the dome supports the power-off memory capability with the dwell time of 3 minutes.

Time Task

A time task is a preconfigured action that can be performed automatically at a specific date and time. The programmable actions include: preset 1-8, pattern 1-4, patrol 1-4, pan scan, tilt scan, random scan, frame scan, panorama scan, day/night mode or none.

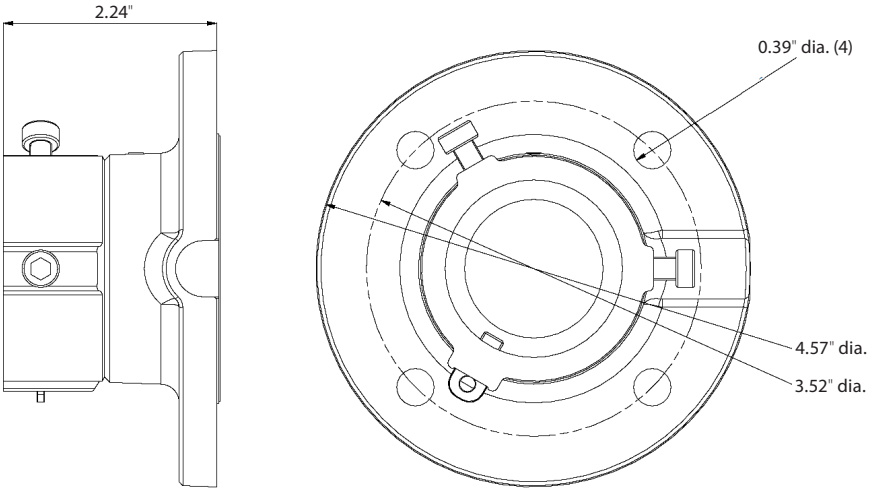
1.2 Accessories

The following accessories are available for the BLK-PTZ36X camera. Mounting bracket detail is shown below.

Model	Type
BLK-PTZCL	Ceiling Mount Bracket
BLK-PTZWB	Wall Mount Bracket
BLK-PTZPM	Pole Mount PTZ Bracket
BLK-PTZCM	Corner Mount PTZ Bracket
BLK-PTZCNTRL	3D Joystick PTZ Controller (Pelco-P/D)

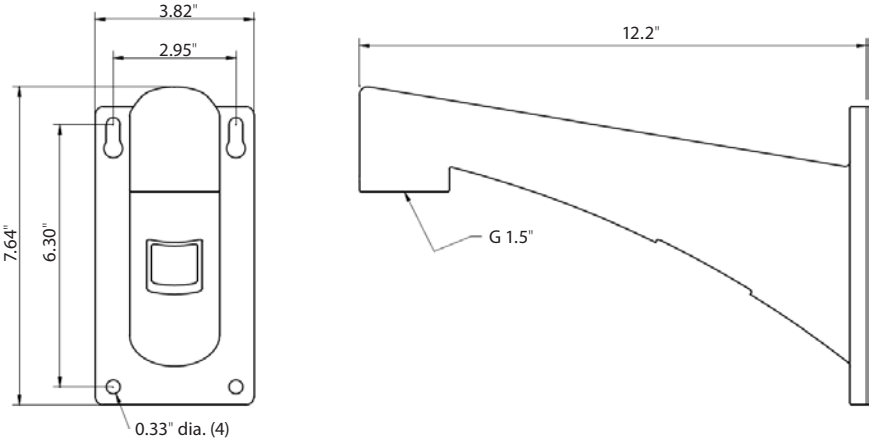
BLK-PTZCL: Ceiling Mount Bracket

The Ceiling Mount Bracket is suitable for outdoor ceiling mounting.



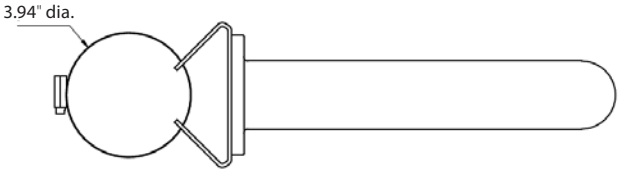
BLK-PTZWB: Wall Mount Bracket

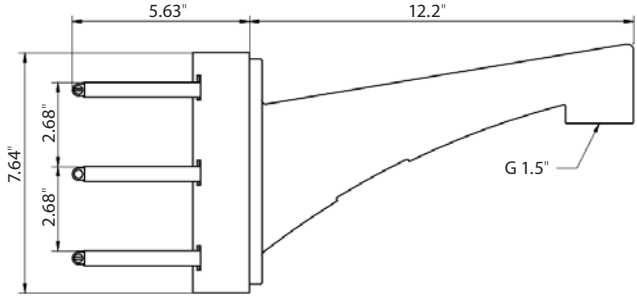
The Wall Mount Bracket is suitable for indoor and outdoor wall mounting.

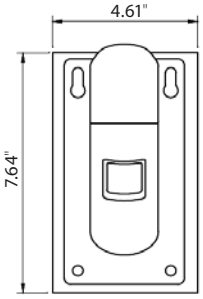


BLK-PTZPM: Pole Mount PTZ Bracket

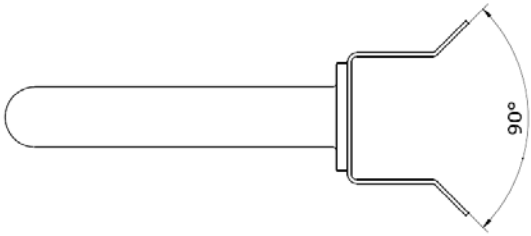
The Pole Mount Bracket is suitable for outdoor pole mounting. The straps can attach to a 2.64" ~ 5.00" diameter pole.

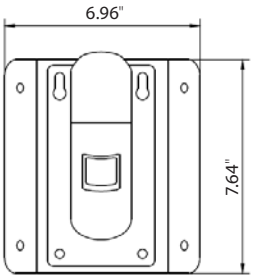


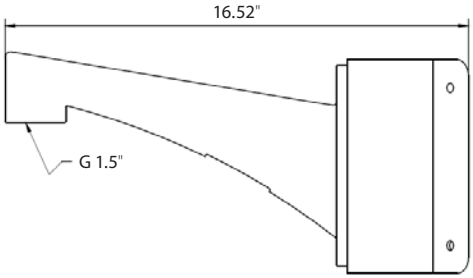




BLK-PTZCM: Corner Mount PTZ Bracket







SECTION 2
Installation

Before you start, check the package contents and make sure that the device in the package is in good condition and all the assembly parts are included. Included are:

- AC power supply
- Installation guide (this user manual)
- Mounting brackets (sold separately)

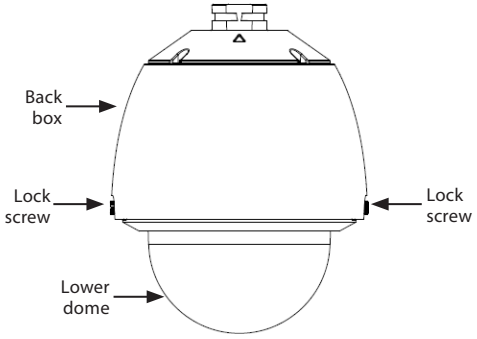
This section includes camera installation using a wall mount bracket (see "2.2 Camera wall mount installation" on page 11) and ceiling mounting bracket (see "2.3 Ceiling mounting" on page 14). For other bracket types, use the procedures included here as guidelines.

2.1 Setup the camera address and baud rate DIP switches

DIP switches inside the camera are used to manually configure the RS-485 device address and network baud rate. The device address and baud rate can also be configured remotely through the OSD (on-screen display) using a control console, DVR or DVS. See "SECTION 3 Getting Started" on page 16 and "SECTION 4 Using the OSD Menus" on page 19 for more information.

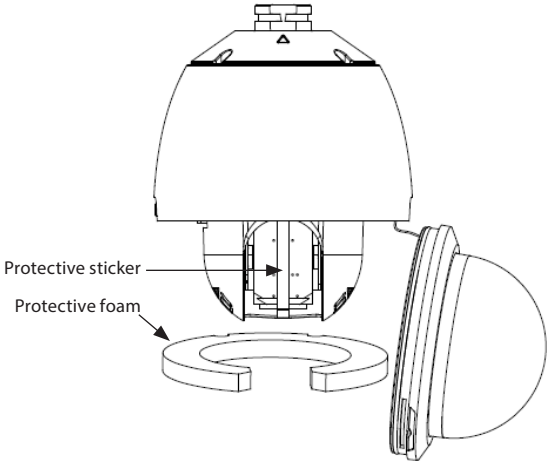
There are two DIP switch groups, SW1 switches 1 .. 8 (sets the RS-485 network address) and SW2 switches 1 and 2 (sets the RS-485 network baud rate). The address setup for the camera must be unique for each device on the RS-485 network. However, the baud rate switched must be configured to the same baud rate used by the other devices on the network. These switches are accessible when the dome cover is removed. To setup the DIP switches, do the following:

1. Loosen the two lock screws as shown in the following figure.



Camera assembly

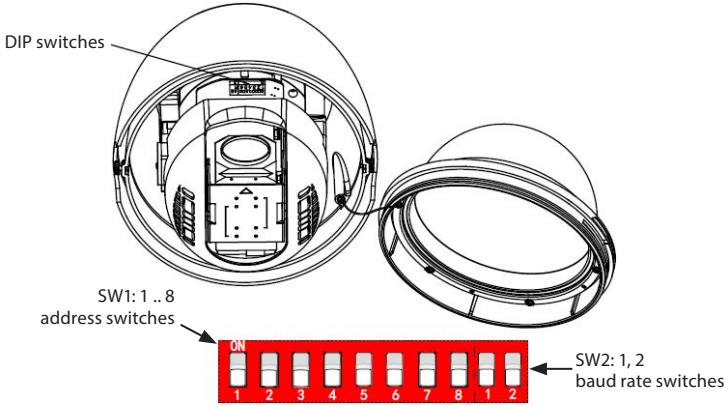
2. Remove the lower dome and remove the protective foam and sticker shown below. Be very careful not to touch the camera lens.



Remove protective foam

3. Locate the DIP switches inside the camera.

NOTE *There are two DIP switch groups, SW1 (for RS-485 network address) and SW2 (for RS-485 network baud rate). The address setup for the camera must be unique for each device on the RS-485 network. However, the baud rate switched must be configured to the same baud rate used by the other devices on the network.*



DIP switches

5. Set the device address DIP switches 1 through 8 using the following table. Each device on the RS-485 network must have a different address. You can configure up to 256 devices (address 0 .. 255) on the RS-485 network. When the switch is pushed up (see the drawing above) it is ON.

Table 1. DIP address switch settings

Dome Address	SW1 (address) switch number							
	1	2	3	4	5	6	7	8
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
…	…	…	…	…	…	…	…	…
255	ON	ON	ON	ON	ON	ON	ON	ON

6. Set the network baud rate DIP switches 1 and 2 using the following table. Each device on the RS-485 network must use the same baud rate. By default, the baud rate is set to 2400 baud (1 → OFF, 2 → OFF).

Baud rate	SW2 switches	
	1	2
2400	OFF	OFF
4800	ON	OFF
9600	OFF	ON
19200	ON	ON

7. Ensure that the camera lens and the inside of the lower dome is clean, then reinstall the lower dome. Position the dome onto the back box, then tighten the two lock screws.

NOTE *Do not put the protective foam back inside the dome. Save the foam and other packaging for possible use at a later time.*

2.2 Camera wall mount installation

Following the instructions below to install the camera using the **BLK-PTZWB Wall Mount Bracket**.

Instructions for mounting the camera with a **BLK-PTZPM Pole Mount PTZ Bracket** or **BLK-PTZCM Corner Mount PTZ Bracket** are very similar. For these brackets, use the instructions below as a guide.

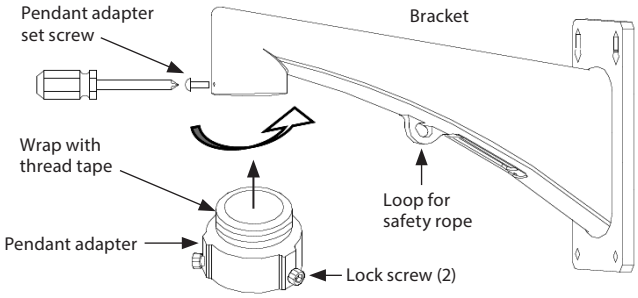
1. If you did not setup the camera DIP switches using "2.1 Setup the camera address and baud rate DIP switches" on page 8, remove the camera dome cover, remove the protective foam, then reinstall the cover. See Section 2.1 steps 1, 2 and 7 above.

2. Determine the best mounting screws and hardware to anchor the mounting bracket with the camera to the mounting surface. Use the following guidelines:
   - For cement wall mounting, use the expansion screw to anchor the bracket.
   - For wooden wall mounting, use self-tapping screw to anchor the bracket.
   - Make sure that the wall is strong enough to withstand more than **8 times** the weight of the camera and the bracket.

3. Using the mounting bracket as a template, mark the location of the mounting screw holes on the mounting surface. Also mark the location of a hole for the camera drop cable. The drop cable will be routed through the mounting bracket and through the mounting surface.

4. Drill holes in the mounting screws and hardware. Also, drill a 1 1/4" diameter hole in the mounting surface for the drop cable.

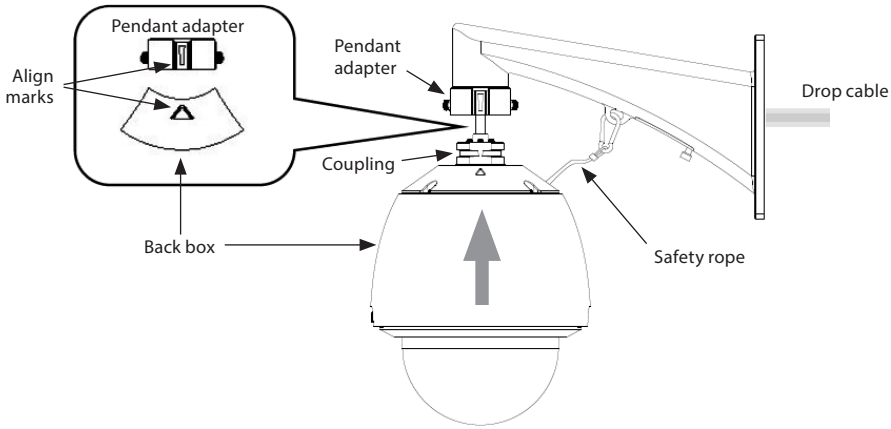
5. Apply two wrap of the thread tape provided onto the treads of the pendant adapter (see below)



Attach pendant adapter to mounting bracket

6. Screw the pendant adapter onto the end of the mounting bracket. Tighten the set screw to secure the adapter to the bracket.

7. Route the camera drop cable through the mounting bracket, then clip the safety rope onto the loop in the mounting bracket.



8. Fit the camera coupling into the pendant adapter, then twist the camera to align the marks on the pendant adapter and the camera back box. See the figure above.

9. Tighten the two lock screws on the pendant adapter to secure the camera to the mounting bracket.

10. Feed the camera drop cable through hole drilled at the mounting location, then anchor the mounting bracket to the wall.

11. Continue installation with "2.4 Connecting the cables" on page 13.

2.3 Ceiling mounting

Following the instructions below to install the camera using the **BLK-PTCL Ceiling Mount Bracket**.

1. If you did not setup the camera DIP switches using "2.1 Setup the camera address and baud rate DIP switches" on page 8, remove the camera dome cover, remove the protective foam, then reinstall the cover. See Section 2.1 steps 1, 2 and 7 above.

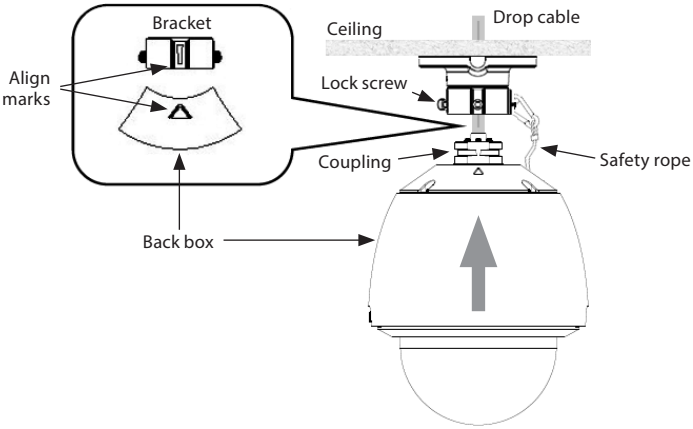
2. Determine the best mounting screws and hardware to anchor the mounting bracket with the camera to the mounting surface. Use the following guidelines:
   - For cement ceiling mounting, use the expansion screw to anchor the bracket.
   - For wooden ceiling mounting, use self-tapping screw to anchor the bracket.
   - Make sure that the ceiling is strong enough to withstand more than **8 times** the weight of the camera and the bracket.

3. Using the mounting bracket as a template, mark the location of the mounting screw holes on the ceiling.

4. If the camera drop cable will be routed through the ceiling, mark the location of a hole for the camera drop cable. The drop cable will be routed through the mounting bracket and can be routed either through the mounting surface or out the side of the mounting bracket.

5. Drill holes in the mounting screws and hardware. Also, drill a 1 1/4" diameter hole in the mounting surface for the drop cable.

6. Route the camera drop cable through the mounting bracket, then clip the safety rope onto the loop in the mounting bracket.



7. Fit the camera coupling into the ceiling mounting bracket, then twist the bracket to align the marks on the bracket and the camera back box. See the figure above.

8. Tighten the two lock screws on the ceiling bracket to secure the camera to the mounting bracket.

9. Feed the camera drop cable through hole drilled at the mounting location, then anchor the mounting bracket to the ceiling.

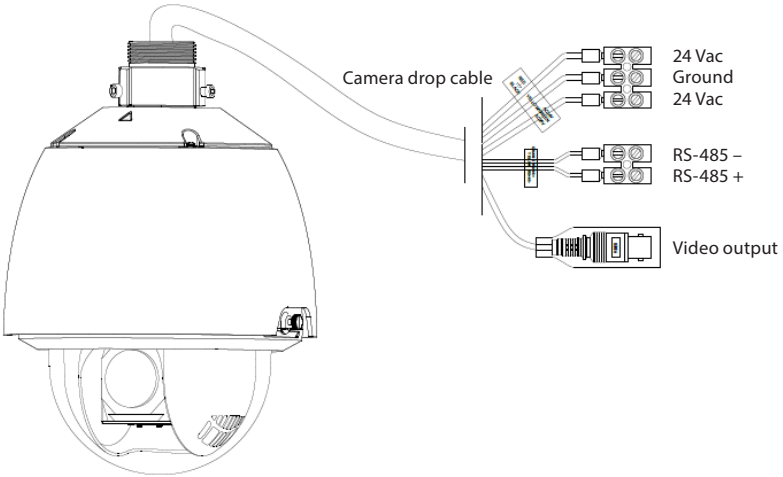
10. Continue installation with "2.4 Connecting the cables" on page 13.

2.4 Connecting the cables

1. Route network cables for video, 24 Vac power and ground, and RS-485 between the remote control device and power source and your camera. Do not apply power to the 24 Vac cables before connecting them to your camera.

Network cabling

2. Connect the network power and ground, RS-485, and video cables to the camera drop cable connectors.

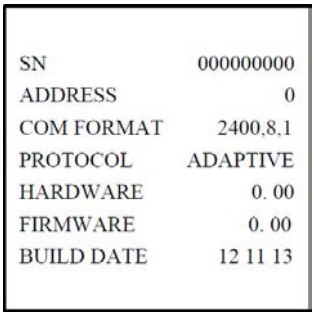


Drop cable connections

3. Connect the network power and ground, RS-485, and video cables to the remote control device and 24 Vac power source.

4. Connect the video output and RS-485 and video output cables to your network extension cables. Connect the other end of these cables to a remote control device, such as a DVR.

5. When power is applied to the camera, a system information display will appear for 2 minutes on top of the live video image from the camera. Verify that the information on the display is intelligible.



Typical System Information display

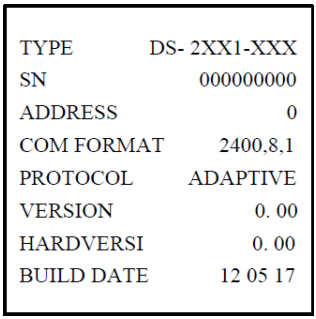
6. Verify that the live video from the camera is clear.

7. Go to "SECTION 3 Getting Started" on page 16 to continue with camera setup using the OSD.

SECTION 3
Getting Started

3.1 Power-up initial display

After the power is applied, the camera will perform a series of self-tests including lens functions, the panning movement and tilting movement. After the power-up self-tests complete, the system information screen is displayed for 2 minutes on top of the live view screen. An example is shown below.



Typical System Information display

Important information about the camera settings is shown in the system information display. See below.

System Information	Description
TYPE	The model of the camera
SN	The serial number of the camera.
ADDRESS	The default communication address of the camera.
COM FORMAT	The communication settings of the RS-485 interface: baud rate (4 digits), data bit (1 digit) and stop bit (1 digit).
PROTOCOL	Protocol configuration for communicating with other devices.
VERSION	The version of the firmware.
HARDVERSI	The version of the hardware.
BUILD DATE	The date when the software was compiled.

If the address of your camera is the same as another camera on the RS-485 network, one of them has to change. Also, if the communication parameters (COM FORMAT) are not the same as the settings on RS-485 network, they must be configured to match. Use the features with your control keyboard, DVR, or DVS to configure these parameters.

3.1.1 Basic operations

You can control the camera using a device such as a control keyboard, DVR, or DVS. In this and the following chapters, operation of the camera by the IE browser connected to a DVR will be used.

NOTE *Ensure that the communication settings and address for the camera are configured properly in the controlling device.*

Panning and tilting: Click the direction buttons to control the movement of the camera.

Zooming: Click the **ZOOM** in/out buttons to control the zooming.

Focusing: Click the **FOCUS+** and **FOCUS-** buttons to adjust the focus.

Iris: Click the **IRIS+** and **IRIS-** buttons to adjust the iris.

3.2 System-defined Presets

The camera system includes special functions that can be initiated by calling a preset number through a control device such as a DVS. These presets are fixed and cannot be edited. To call the system-defined presets remotely, you can choose the preset number from the list in the PTZ control panel. For instance, preset 99 is the **Start auto scan**. If you call preset 99, the camera starts the auto scan function. The table below lists the preset numbers and functions defined for the system.

Table 2. System-defined presets

Preset No.	Function	Preset No.	Function
33	Auto-flip	93	Set manual limit stops
34	Return to home position	94	Remote reboot
35	Patrol 1	95	Access main menu
36	Patrol 2	96	Stop scanning
37	Patrol 3	97	Start random scanning
38	Patrol 4	98	Start frame scanning
39	IR cut filter in	99	Start auto scanning
40	IR cut filter out	100	Start tilt scanning
41	Pattern 1	101	Start panorama scanning
42	Pattern 2	102	Patrol 5
43	Pattern 3	103	Patrol 6
44	Pattern 4	104	Patrol 7
92	Enable limit stops	105	Patrol 8

3.3 On Screen Displays

The camera supports following on screen displays:

Zoom: Identifies the amount of magnification. The format is ZXXX. where "XXX" is the zoom amount.

Direction: Displays panning and tilting direction, with the format of NEXXX TYYY, where "XXX" indicates the degrees in north east (NE) direction, and "YYY" indicates the degrees in tilt position.

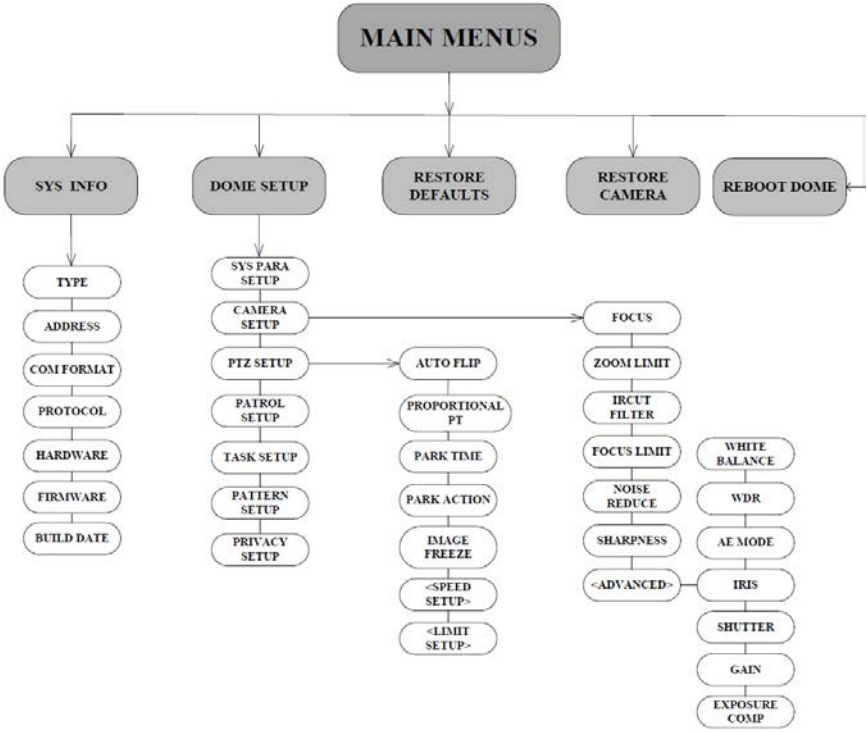
Time: Support for time display.

Preset Title: Identifies preset being called.

Temperature: Displays the temperature of the camera.

SECTION 4
Using the OSD Menus

The menu structure of the on-screen display (OSD) is shown below.



You can control the camera using the on-screen display menu remotely by connecting to a DVR or a DVS (encoder). Examples of entering camera menu include:

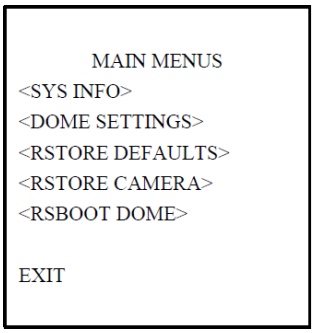
- Enter the menu by pressing buttons: **PTZ → REC → 9 → 5** on the front panel of the DVR.
- Enter the menu by pressing buttons: **CALL → 9 → 5 → ENTER** on the keyboard.
- Enter the menu via the IE browser of a DVR/DVS.

Menu operations via the IE browser of a DVR will be used for the example in this chapter.

4.1 Accessing and operating the menus

To open the **Main Menus**:

1. Connect the video and RS-485 cables from the camera to a DVR.
2. Access the DVR with an internet browser.
3. View the live video from the camera.
4. Call preset 95 from the preset list in the PTZ control panel of the DVR.



Main Menus

To move the cursor and operate the menu:

- **Move the cursor up/down**: On control panel of the live view interface of the DVR, click the **UP** and **DOWN** direction buttons or **FOCUS+** and **FOCUS-** buttons to move the cursor up and down in the menu.
- **Enter / Exit**: On control panel of the live view interface of the DVR:
  - Click **IRIS+** to enter a submenu
  - Move the cursor to **BACK** in the menu
  - Click **IRIS+** to return to the previous menu, or move the cursor to EXIT the menu and then click **IRIS+** to exit the menu.
- **Page up / page down**: There is no **RETURN** or **NEXT** menu items for turning a page up or down. On control panel of the live view interface of the DVR, you can click the left and right direction buttons to turn the page up or down.

To change the value of a parameter:

1. Move the cursor to the target item and then click **IRIS+**. The cursor (diamond mark) will change to be hollow.
2. Click the up/down or left/right buttons in the PTZ control panel to choose the value from the selectable value list.

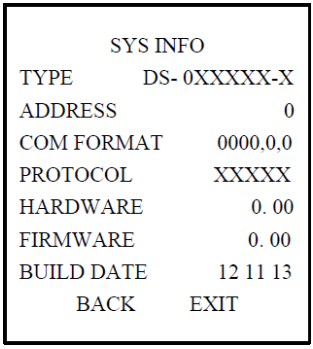
3. Click **IRIS+** to confirm the change or click **IRIS-** to cancel and restore the original value. The diamond mark will change back to be stuffed or half stuffed icon.

4.2 Configuring System Information

4.2.1 Checking System Information

System information menu displays the current system information of the camera including the model, address, protocol, etc. The information shown on this submenu is similar to the system information shown after camera power-up.

To open the system information display menu, go to **MAIN MENUS → SYS INFO**



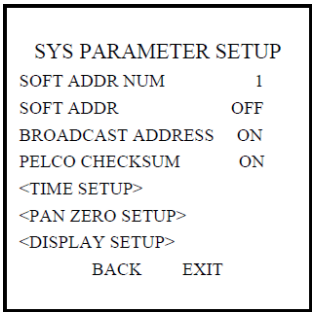
Typical System Information display

NOTE *The SYS INFO display is presented for Information only. It cannot be edited directly.*

4.2.2 Configuring system parameters

You can check and edit the system information including software address, baud rate, system time, etc. on the system information settings menu.

To enter the system information settings menu, go to **MAIN MENUS → DOME SETUP → SYS PARAMETER SETUP**



System Parameter Setup

NOTE *Using an internet browser connected to a DVR, click the left and right direction buttons in the PTZ control panel to page up or page down when more than one page is available.*

Descriptions of system parameter configuration:

- **Dome address settings**

  TASK 1: Set the soft address of the camera.

  If the **SOFT ADDR ACTIVE** is set ON, the soft address is the valid address for connecting the camera. The **SOFT ADDRESS** ranges from 1 to 255.

  If the **SOFT ADDR ACTIVE** is set as OFF, the hard address set by the DIP switch is the valid address of the camera.

  TASK 2: Set the broadcast address of the camera.

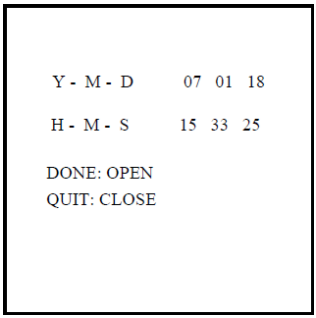
  When the **BROADCAST ADDRESS** is set to ON, the control devices with address 0 can control the camera remotely regardless of the address of the camera.

  With this function on, a control device with address 0 can control all PTZ cameras connected to it. This function is usually used for debugging.

- **PELCO checksum**

  If the camera uses PELCO-P or PELCO-D protocol, you can set the PELCO CHECKSUM as ON for improving the controlling effect.

- **System time configuration**
  a. Move the cursor to **SYSTEM TIME** using the direction buttons, then click **IRIS+** to enter.
  b. Click the left or right direction buttons to position the cursor on the specific item (year/month/day or hour/minute/second) of which you want to change the value.
  c. Click the up or down direction buttons to increase or decrease the value.
  d. Click **IRIS+** button to confirm and exit.

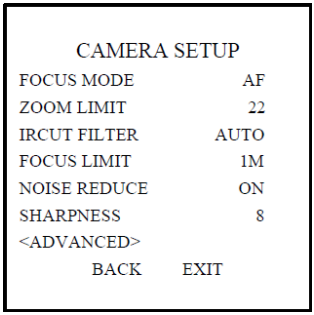


Set System Time

- **Pan Zero angle (initial position) configuration.** You can define the initial position of the camera on the PAN ZERO SETUP submenu.
  a. Move the cursor to **PAN ZERO SETUP** using the direction buttons, then click **IRIS+** to enter.
  b. Click the left or right or up or down direction buttons to adjust the view angle.
  c. Click **IRIS+** button to confirm and exit.

4.3 Configuring Image Parameters

You can set the camera parameters including focus, shutter speed, iris, etc. Configuring image parameters for the camera includes several tasks (see below). To enter the camera parameters settings menu, go to **MAIN MENUS → DOME SETUP → CAMERA SETUP**



Camera Setup

4.3.1 TASK 1. Configure the focus settings

- **Setting the focus mode**

  a. Move the cursor to FOCUS using the direction buttons and click **IRIS+** to change the cursor to totally hollow.

  b. Click up/down direction buttons to choose the focus mode as AF, MF or HAF.

  AF (Auto-focus): The lens remains in focus during PTZ movements.

  MF (Manual Focus): You need to adjust the focus with **FOCUS+** and **FOCUS-** buttons manually.

  HAF (Half-auto Focus): The camera focuses automatically only once after panning, tilting and zooming.

  c. Click **IRIS+** button to save the settings.

- **Setting the focus limit**. This function is used to limit the minimum focus distance. You can configure the focus limit to a longer distance when the target is at a distance to prevent the camera from focusing on the objects close to it; or configure the focus limit to a shorter distance when the target is near the camera to prevent it from focusing on objects father away. You can set the **FOCUS LIMIT** to 1CM, 30CM, 1M, 3M, 5M, 20M, or AUTO.

4.3.2 TASK 2. Configure the zoom limit

- **Setting the zoom limit**. Zoom limit is a user-defined limitation of the zoom amount.

  a. Move the cursor to **ZOOM LIMIT** using the direction buttons and click **IRIS+** to open the submenu.

  b. Click the up or down direction buttons to choose the limit.

c. Click **IRIS+** to confirm your settings.

4.3.3 TASK 3: Set the Day/Night Mode

- **IR cut filter**. This filter It can be configured as AUTO, DAY or NIGHT.

  AUTO: The camera switches automatically from Black and White mode (**NIGHT**) and Color mode (**DAY**) in response to lightening conditions (default).

  NIGHT (B/W): The IR cut filter will switch to NIGHT mode to increase the sensitivity in low light conditions.

  DAY (Color): The IR cut filter will perform in DAY mode (normal lighting conditions).

NOTE *You can also call preset **39** to set the IR cut filter mode to DAY mode and call preset **40** to set it as NIGHT mode.*

4.3.4 TASK 4: Set Digital noise reduction

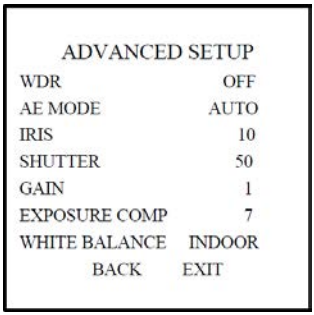
To reduce the image noise, you can set the **NOISE REDUCE** function **OFF** or **ON**.

4.3.5 TASK 5: Set the sharpness level

The sharpness function can increase the gain of the image and sharpen the edges in the picture to enhance the picture details. You can set the SHARPNESS level from 0 to 15.

4.3.6 Task 6: Set the WDR function

To set the WDR, open the **ADVANCED SETUP** menu. Go to **MAIN MENUS → DOME SETUP → CAMERA SETUP → ADVANCED SETUP**



Advanced Setup settings

You can set the WDR (Wide Dynamic Range) to ON or OFF to enable or disable the function. When both very bright and very dark areas appear simultaneously in the field of view, the WDR function can balance the brightness level of the entire image and provide clear images with details.

4.3.7 TASK 7. Configure iris, gain and shutter speed

- **Setting the AE mode**. AE mode defines the priority of the iris, shutter and gain when the camera adjusts the brightness of the video. The options in AE MODE are as follows:

  AUTO: Auto iris, auto shutter and auto gain. The camera adjusts these values automatically responding to the lighting conditions. This is the default mode.

  MANUAL: In MANUAL mode, you can adjust the shutter, iris and gain values.

- **Setting the iris value**. To adjust the iris size for light entering the lens, you can set the IRIS value manually according to light conditions. The iris value ranges from 0 (closed) to 17 (fully open).

- **Setting the gain**. The value of gain indicates the degree of amplification of the original light signal. You can set the value from 0 to 15.

- **Setting the shutter speed**. The speed of the electronic shutter controls the amount of light entering the lens in a unit of time (a second). You can manually configure the shutter speed for the camera, and you can also enable the slow shutter function for low lighting circumstances.

  If you set the SHUTTER value larger, the shutter speed is faster. The value indicates the inverse of the shutter speed (1/value seconds). At faster speeds, the amount of light entering the lens is less causing the image to be darker. You can set the shutter value to 1, 2, 4, 8, 15, 30, 50, 125, 180, 250, 500, 1000, 2000, 4000 or 10000.

4.3.8 TASK 8: Set Exposure compensation function

Adjust this value to increase the brightness of the image. You can set the EXPOSURE COMP value from 0 to 14. The default value is 7.

4.3.9 TASK 9: Set White balance

Set WHITE BALANCE mode to AUTO, INDOOR, OUTDOOR, SELFDEF (self-defined), ATW (auto-tracking) or HAUTO (half-auto)..

AUTO: In Auto mode, the camera adjusts the color balance according to the current color temperature.

INDOOR, OUTDOOR: These modes are for indoor use and outdoor use respectively.

SELFDEF: In SELFDEF you can adjust the color temperature, the RED and BLUE values, manually.

ATW: In auto-tracking mode, white balance is adjusted continuously to accord with the color temperature of the scene illumination.

HAUTO: Selecting this mode, the viewed image retains color balance automatically according to the current color temperature.

4.3.10 Configuring Privacy Mask

Privacy mask enables you to cover specific areas on the live video to prevent these from appearing in live view and recorded video. The masked areas can move with the panning/tilting movements and automatically adjust their size when the lens zoom changes.

1. Open the privacy mask configuration submenu. Go to **MAIN MENUS → DOME SETUP → PRIVACY SETUP**

Privacy Blank configuration menu

2. Choose the privacy mask number:

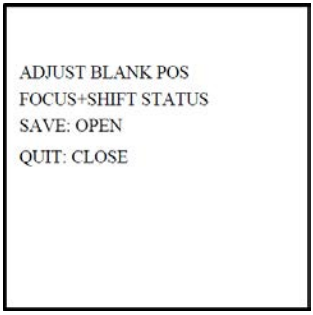
a. Move the cursor to **BLANK NUM** and click **IRIS+** to enter the editing mode.

b. Click the up and down direction buttons to select a mask number for configuration.

c. Click **IRIS+** again to confirm and exit the editing mode.

3. Configure the position and size of the privacy mask.

a. Move the cursor to **SET BLANK** and click **IRIS+** button to enter the editing mode as shown in the following figure. You can see a privacy mask on the live window.



Set the Privacy Mask

b. When the *ADJUST BLANK POS* message appears, use the direction buttons to shift the position of the privacy mask.

c. When you click the **FOCUS+** button, the *ADJUST BLANK SIZE* message will appear. Click the up/down buttons to increase/decrease the height of the mask, and click right/left buttons to increase/decrease the width of the mask. Click **IRIS+** button to save the settings and return to the previous menu and you can see the mask turn to gray.

d. To modify the mask, click **IRIS+** button to enter the **SET BLANK** menu, then click **IRIS+** button again to reconfigure the mask.

NOTE *The tilt range for configuring the privacy masks is from 0° to 70°.*

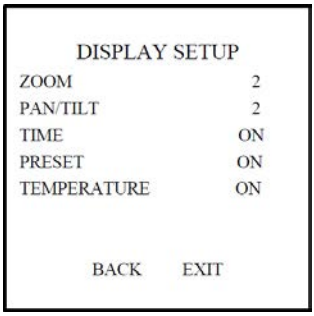
4. **Enable or disable the privacy mask function**: Open the **BLANK STATUS** submenu, then click the up and down direction buttons to set it ON or OFF. If no privacy mask is configured, you cannot set the status as ON.

5. **Delete the privacy mask**: You can enter the **DELE BLANK** menu to delete the current privacy mask.

4.3.11 Configuring OSD settings

The on-screen display of the PTZ movements, temperature, system time, etc. can be enabled or disabled.

1. Open the display settings menu: Go to: **MAIN MENUS → DOME SETUP → SYS PARAMETER SETUP → DISPLAY SETUP**



Display settings

2. Move the cursor to **DISPLAY SETUP** using the direction buttons and click **IRIS+** to enter.

3. Move the cursor to the target item and click **IRIS+** and click up/down direction buttons to choose each display mode as ON or OFF, and define each display time as 2 seconds, 5 seconds or 10 seconds.

4. Click **IRIS+** button to confirm.

Display the viewing direction

The camera displays a viewing direction code when you manually rotate the camera. Codes are shown in the table below.

Display	N	NE	E	SE	S	SW	W	NW
Indication*	North	Northeast	East	Southeast	South	Southwest	West	Northwest

* The north direction refers to the 0º angle (initial position).

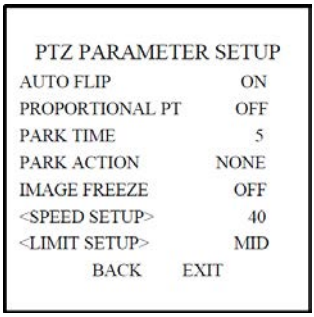
The temperature display refers to the internal temperature of the camera.

4.4 Configuring PTZ control parameters

You can configure panning, tilting and zooming movements, and configure PTZ control functions including presets, patrols, patterns, etc. for the camera.

4.4.1 Configuring PTZ parameters

Open the PTZ configuration menu. Go to **MAIN MENUS → DOME SETUP → MOTION PARAMETER SETUP**



PTZ PARAMETER SETUP menus

Descriptions of PTZ parameter configuration:

- **Auto-flip**. In manual tracking mode, when a target object moves directly beneath the camera, the camera automatically rotates 90 degrees horizontally (flips) for tracking. The default setting of AUTO-FLIP is ON for this camera model.
- **Proportional Panning / Tilting**. When this function is enabled, the pan/tilt speed changes according to the amount of zoom. If using high zoom, the pan/tilt speed is slowed to keep the image from moving too fast on the live view display. You can set PROPORTIONAL PAN to ON or OFF to enable/disable the function. This function is enabled automatically while setting patterns.

Park time and actions

This feature allows the camera to start a predefined action (park action: scan, preset, pattern, etc.) automatically after a period of inactivity (park time).

You can set PARK TIME from 5 to 720 seconds and set the park action (PARK ACT) as preset 1 to 8, pattern 1 to 4, patrol 1 to 8, pan scan, tilt scan, random scan, frame scan, panoramic scan, day mode, night mode or none.

Image freeze

This feature enables the live view to switch directly from one scene defined by a preset to another, without showing the middle areas between these two, to ensure the surveillance efficiency. It can also reduce the use of bandwidth in a digital network system.

To enable this function, set IMAGE FREEZE to ON.

PTZ speed

You can define the speed of the dome movements in the **SPEED SETUP** submenu.

DOME SPEED: the manual movement speed can be set to HIGH, MID or LOW.

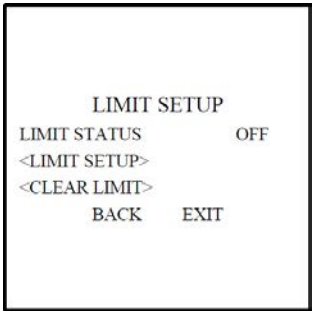
SCAN SPEED: scan speed defines the scan degree per second of a panning scan, tilting scan, frame scan, random scan and panoramic scan. Scan speed is adjustable from 1 to 40 degrees per second.

PRESET SPEED: the speed of calling a preset can be set from level 1 to 8. The higher levels will call a preset faster.

Limit stops

The camera can be programmed to move within the configurable limit stops (left/right, up/down). To set these limits:

1. Move the cursor to **LIMIT SETUP** in **PTZ PARAMETER SETUP** menu, then click **IRIS+** to open the submenu.



Limit Setup menu

2. Move the cursor to **LIMIT STATUS**, click **IRIS+** to set it ON to enable the feature.

3. Move the cursor to **<LIMIT SETUP>** in the **LIMIT SETUP** submenu, then click **IRIS+**. The message *SET LEFT LIMIT* will appear.

4. Click the direction buttons in the PTZ control panel to position the left limit stop, then click **IRIS+** to confirm.

5. Follow the steps above to configure the right, up and down limit stops on the menu. The new limit stops will overwrite the existed ones.

6. You can clear the defined limit stops. Click **IRIS+** to enter **CLEAR STOPS**, then click **IRIS+** again to clear the stops.

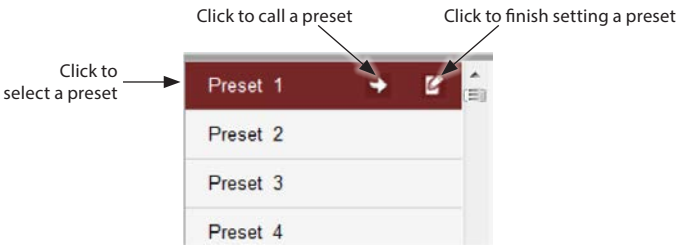
4.5 Configuring Presets

A preset is a predefined direction. For the defined preset, you can click the calling button to move the camera to that direction. There is no preset menu in the OSD. You can set presets with the PTZ panel of the control device or the keyboard.

4.5.1 TASK 1: Set a preset.

To set a preset direction:

1. In the PTZ control panel, select a preset number from the preset list.



Presets configuration men

2. Use the PTZ control buttons to move the lens to the desired position.

3. Click the "finish" icon (see above) the set the preset.

4.5.2 TASK 2: Call a preset

Through a web browser connected to your DVR, select the preset number from the preset list in the control panel of the DVR, then click the icon to call the preset.

4.6 Configuring Patrols

A patrol is a memorized series of preset function. It can be set and previewed on the patrol settings interface.

4.6.1 TASK 1: Set a patrol

You can configure up to 8 patrol numbers.

1. Open the patrol configuration submenu. Go to **MAIN MENUS → DOME SETUP → PATROLS SETUP**

Patrol Setup menu

2. Edit a patrol:

   a. Move the cursor to **PATROL SETUP**, then lick **IRIS+** to enter edit mode.

NUM	PRESET	DWELL	SPEED
1	0	6	30
2	0	6	30
3	0	6	30
4	0	6	30
5	0	6	30
6	0	6	30
7	0	6	30
DONE: OPEN		QUIT:CLOSE	

   b. Click the up and down direction buttons to select the number of the patrol which is to be edited.

c. Click the left/right direction buttons to position the cursor to PRESET, DWELL TIME and SPEED of a preset. Click the up and down direction buttons to set each value.

- The preset you select for the patrol should be a defined preset.
- The dwell time is the time the camera will pause on a preset.
- The speed of the patrol is the speed the camera will switch between presets.

3. Follow above steps to define other presets for the selected patrol. You can configure up to 32 presets in sequence for a patrol. Click **IRIS+** to save the current settings, or click **IRIS-** to cancel and return to the previous menu.

4.6.2 TASK 2: Preview the patrol

Move the cursor to **<PREVIEW PATROL>**, then click **IRIS+** to preview the current patrol and enable the camera to scan among the presets.

4.6.3 TASK 3: Delete a patrol

You can move the cursor to **<DELE PATROL>**, then click **IRIS+** to delete the current patrol.

4.6.4 TASK 4: Call the defined patrol

To call a patrol, use a web browser connected to your DVR to select the corresponding preset number from the drop-down list in the control panel, then click the icon to call the related patrol. For example, you might call preset 35 to call patrol 1. Refer to "4.6 Configuring Patrols" on page 33 for more information.

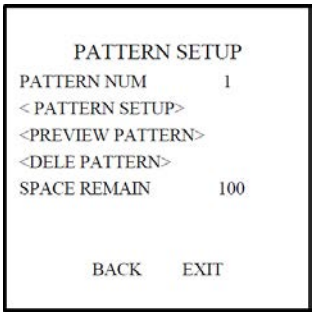
4.7 Configuring Patterns

A pattern is a repeatable series of panning, tilting, zooming and preset movements that can be recalled by a command or automatically performed by a configured function (alarm, park, time task, and power-up).

4.7.1 TASK 1: Set a pattern

You can configure up to 4 patterns. To set a pattern:

1. Open the PATTERNS submenu. Go to **MAIN MENUS → DOME SETUP → PATTERN SETUP**



Patterns configuration menu

2. Choose the pattern number:

   a. Move the cursor to **PATTERN NUM** and click **IRIS+** to enter edit mode.

   b. Click the up and down direction buttons to select the number of the pattern you want to configure.

   c. Click **IRIS+** again to confirm.

3. Edit the pattern.

   a. Move the cursor to <**PATTERN SETUP**> and click **IRIS+** to enter edit mode.

Edit pattern

   b. Click the PTZ control buttons and direction buttons to pan, tilt, or zoom in/out the camera to draw a movement path. The camera can automatically memorize the path you enter as a pattern.

c. Click **IRIS+** again to save the pattern and exit edit mode.

NOTE

- *REMAIN MEMORY indicates the remaining memory of the camera for configuring patterns. When it reaches 0, no more patterns can be configured. You can also see the remaining memory shown under PATTERNS menu as REMAINING.*
- *Panning/tilting movements and lens operations cannot be memorized simultaneously.*

4.7.2 TASK 2: Preview a pattern

To preview a pattern, open the **<PREVIEW PATTERN>** menu to see the current pattern.

4.7.3 TASK 3: Delete patterns

- To delete a selected pattern, click **IRIS+** to enter **<PATTERN SETUP>**. When you see **DEL PATH ABOVE**, click **IRIS+** to delete the pattern.
- To clear all the patterns, open the **<DELE PATTERN>** menu, then click **IRIS+** to delete all the defined patterns.

4.7.4 TASK 4: Call the defined pattern.

Through a web browser connected to a DVR, select the corresponding preset number from the drop-down preset list in the control panel, then click the arrow to call the related pattern. For example, call preset 41 to call pattern 1.

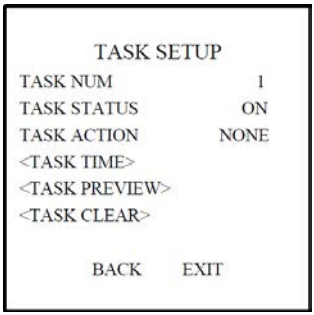
4.8 Configuring Time Tasks

A time task is a scheduled camera action configured to perform automatically at the specific time.

4.8.1 TASK 1: Set time tasks

You can configure up to 8 time tasks. To configure a time task:

1. Open the **TIME TASK** submenu: Go to **MAIN MENUS → DOME SETUP → TASK SETUP**



Time Task configuration menu

2. Choose the task number.

    a. Move the cursor to **TASK NUM** and click **IRIS+** to enter edit mode.

    b. Click the up and down direction buttons to select the task number you want to configure.

    c. Click **IRIS+** again to confirm and exit edit mode.

3. Set the task status.

    a. Move the cursor to **TASK STATUS** and click **IRIS+** to enter edit mode.

    b. Click the up and down direction buttons to set the task status to **ON**.

    c. Click **IRIS+** again to confirm and exit edit mode of this column.

4. Configure the task action.

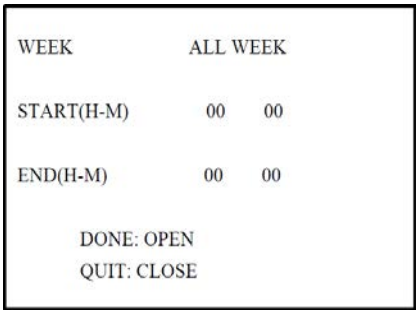
    a. Move the cursor to **TASK ACTION** and click the **IRIS+** to enter edit mode.

    b. Click the up and down direction buttons to select the task action from preset 1 to 8, pattern 1 to 4, patrol 1 to 8, panning scan, tilting scan, random scan, frame scan, panoramic scan, day mode, night mode or none.

    c. Click **IRIS+** again to confirm and exit edit mode of this column.

5. Set the task time.

    a. Move the cursor to **TASK TIME** and click **IRIS+** to enter edit mode.

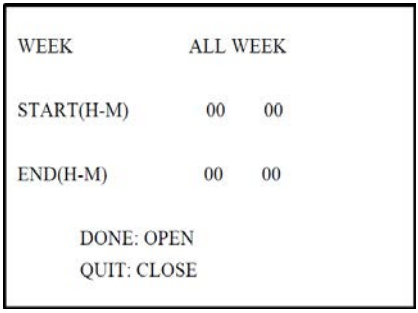


Set the Time Task

b. Click the left and right direction buttons to position the cursor to WEEK, START (H-M) or END (H-M).

c. Click the up and down direction buttons to select the specific day and time. The weekday can be set to be from **Monday** to **Sunday** or **All Week**.

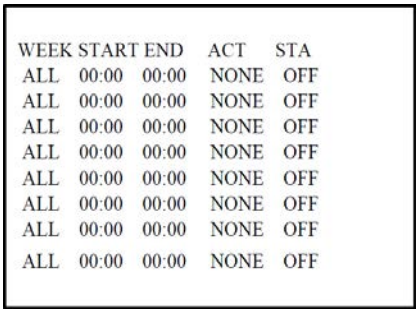
d. Click **IRIS+** to confirm and exit.



Set the Time Task

4.8.2 TASK 2: Preview the task

To preview a time task, move the cursor to **<TASK PREVIEW>**, then click **IRIS+** to view the time, action and status of the scheduled task.



Preview the time task

4.8.3 TASK 3: Delete the task.

To delete a task, move the cursor to **CLEAN TASK** and click **IRIS+** to delete the time and action of the current task.

4.9 Others

4.9.1 Restoring default dome setup

You can reset all dome settings to factory default parameters as shown in the table below. Dome settings include mostly PTZ parameters and some system settings, for example, the dome address.

1. Open the default dome settings menu. Go to **MAIN MENUS → RESTORE DEFAULTS**
2. Click **IRIS+** to restore the dome settings to the values shown in the table below, or click **IRIS-** to exit.

Table 3. Default dome settings

Parameters	Default Value
Dome address	0
Baud rate	2400 bps
Soft address	Off
Initial Position	Zero angle
Auto-focus	On
Zoom limit	Max. Optical Zoom
Zoom speed	High

Parameters	Default Value
AE mode	Auto
Exposure compensation	On
White balance	Auto
Auto-flip	Off
Proportional pan	On
Park time	5 seconds
Park action	None
Scan speed	Level 23
Preset image freeze	Off
Limit stops	Off
Time display	Off
Zoom and preset label display	Display for 2 seconds

4.9.2 Restoring camera default settings

Camera settings include the image parameters, lens settings and display settings. To restore the default settings in the camera:

1. Open the menu: **MAIN MENUS → RESTORE CAMERA**
2. Click **IRIS+** to restore the camera settings to the default value, or click **IRIS-** to exit.

4.9.3 Rebooting the camera

Open the **MAIN MENUS → REBOOT DOME** menu, then click **IRIS+** to reboot the camera remotely.

SECTION 5
Specifications

Table 4. Table of Specifications

Area	Parameter	Specification
Camera	Image sensor	1/4" Sony® 960H CCD
	Effective pixel	976(H) × 582(V)
	Horizontal resolution	Color: 700 TVL; B/W: 750 TVL
	Signal system	NTSC
	Minimum illumination	Color: 0.02 lux / (F1.6, AGC ON), 0.0008 lux / (F1.6, AGC ON, sensitivity × 256) B&W: 0.002 lux / (F1.6, AGC ON), 0.00008 lux / (F1.6, AGC ON, sensitivity × 256)
	White balance	Auto / One touch WB / ATW / Indoor / Outdoor
	AGC	Auto / Manual
	S / N Ratio	≥ 50 dB
	DNR	High / Medium / Low / off
	WDR	128x (On / Off / Auto)
	Shutter Time	1 ~ 1/10,000 s
	Day and Night	IR Cut Filter
	Digital zoom	16x
	Privacy mask	8 privacy masks programmable; a maximum of 8 zones can be masked simultaneously on the same video screen
	Focus mode	Auto / Semiautomatic / Manual
Lens	Focal length	3.3-119 mm, 36X
	Zoom speed	6 s (Optical Wide-Tele) approx..
	Angle of view	57.1 ~ 1.7 degree (Wide-Tele)
	Minimum working distance	10 ~ 1000 mm (Wide-Tele)
	Aperture range	F1.4 ~ F3.7
Pan and Tilt	Pan range	360° endless
	Pan speed	Pan Manual Speed: 0.1°/s ~ 250°/s, Pan Preset Speed: 300°/s
	Tilt range	-5° ~ 90° (auto flip)
	Tilt speed	Tilt Manual Speed: 0.1°/s ~ 150°/s, Tilt Preset Speed: 200°/s
	Proportional zoom	Rotation speed can be adjusted automatically according to zoom multiples
	Number of Presets	255
	Patrol	8 patrols, up to 32 presets per patrol

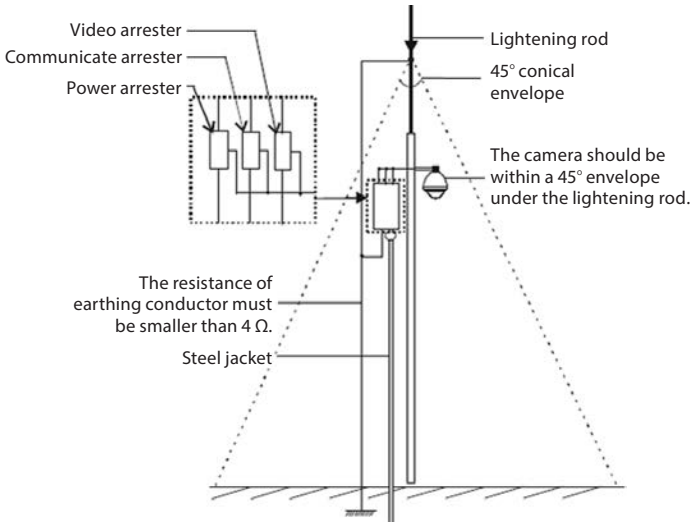
SECTION 5: SPECIFICATIONS

Area	Parameter	Specification
Pan and Tilt (cont.)	Pattern	4 patterns, with a total recording time not less than 10 minutes
	Power-off Memory	Support
	Park Action	Preset / Patrol / Pattern / Pan / Tilt / Auto / Random / Frame / Panorama scan
	PTZ Position Display	On / Off
	Compass	Support , north direction can be set
	Scheduled Task	Preset / Patrol / Pattern / Pan / Tilt / Auto / Random / Frame / Panorama scan
Input / Output	Monitor Output	1.0 Vp-p / 75 Ω, composite, BNC
General	Menu Language	English/Chinese
	RS-485 Protocols	Pelco-P, Pelco-D, self-adaptive
	Power	24 Vac (outdoor dome): 20 W max. (heater on), 12 W max. (heater off), Indoor dome: 12 W max.
	Working temperature / humidity	-22 °F ~ 149 °F (-30 °C ~ 65 °C)(outdoor dome); 14 °F ~ 122 °F (-10 °C ~ 50 °C) (indoor dome) / 90% or less
	Protection level	IP66 standard (outdoor dome), TVS 4,000 V lightning protection, surge protection
	Mounting	Various mounting modes optional
	Dimensions	Φ8.66" × 12.00" (Φ220 × 305 mm)(outdoor), Φ7.22" × 9.56" (Φ183.4 × 243 mm) (indoor), Φ9.65" × 9.29" (Φ245 × 236 mm) (in-ceiling)
	Weight (approx.)	11.02 lbs (5 Kg)
	Mount option (only suitable for outdoor dome)	Ceiling Mount Bracket: BLK-PTZCL Wall Mount: BLK-PTZWB Pole Mount PTZ Bracket: BLK-PTZPM Corner Mount PTZ Bracket: BLK-PTZCM

APPENDIX A
Lightning and Surge Protection

This product includes TVS plate lightning protection technology to prevent damage caused by a pulse signal that is below 3000 watts from sources such as lighting, surging, etc. Protection measures must be taken to ensure electrical safety.

- The distance between signal transmission line and high-voltage equipment or high-voltage cable is at least 50 m.
- Outdoor wiring should better be along the eaves as much as possible.
- In the open field, wiring should be buried underground in sealed steel pipe with one-point grounding. Overhead routing method is not acceptable.
- In regions with thunderstorms or where high induction voltage are present (such as high-voltage transformer substation), high power lightning protection apparatus and lightning conductor are necessary.
- The design for installation and wiring with lightning protection and grounding should be combined with the lightning protection consideration of the building, and conform to the relevant national and industry standards.
- The system should ensure equi-potential grounding. Grounding equipment must satisfy both system anti-jamming and electric safety. It must not allow short circuit and open circuit with the zero conductor of strong grid. When the system is singularly ground, the resistance must be no more than 4 Ω and the cross-sectional area of the grounding cable must be no less than 25 mm^2. For grounding instructions, refer to local electrical codes and this manual.



Lightning & Surge Protection

APPENDIX B
RS-485 Bus Connection

General Property of RS-485 Bus

RS-485 is a half-duplex communication bus that has a 120 Ω characteristic impendence. The maximum load ability is 32 payloads (including controller device and controlled device).

RS-485 Bus Transmission Distance

For 0.56 mm (24AWG) twisted-pair wire, the maximum transmission distance for different baud rates is shown as below:

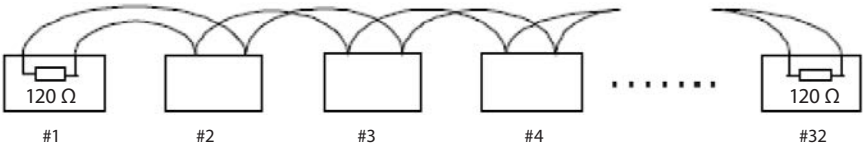
Max. Distance of RS-485 transmission with 24AWG wire

Baud rate	Maximum distance
2400 bps	5900 ft (1800 m)
4800 bps	3900 ft (1200 m)
9600 bps	2600 ft (800 m)

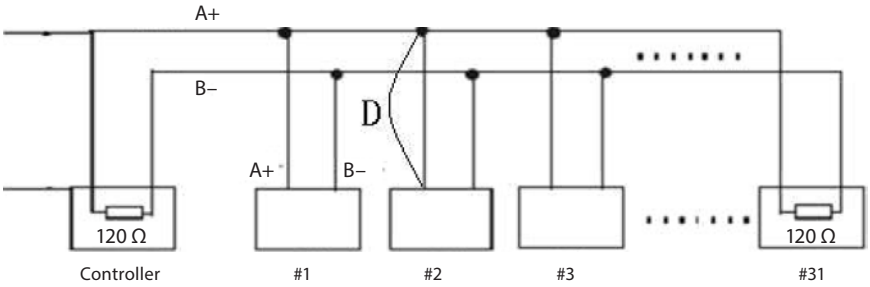
The transmission distance is decreased for thinner cable, when the wire is exposed to strong electromagnetic interference. If many devices are installed on the bus, the transmission distance is increased.

Connection Methods

RS-485 industry bus standard requires a daisy-chain connection method between any devices, both sides have to connect a 120 Ω terminal resistance (see the diagram **Connection 1** below). The simplified connection method is shown as diagram 2; the distance of "**D**" should be short.



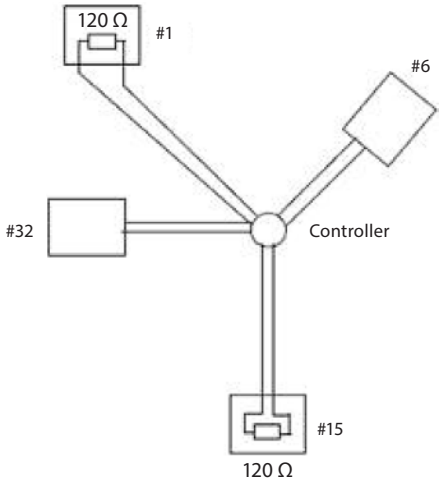
RS-485 Connection 1 diagram



RS-485 Connection 2 diagram

Problems in the practical application - star-shaped architecture

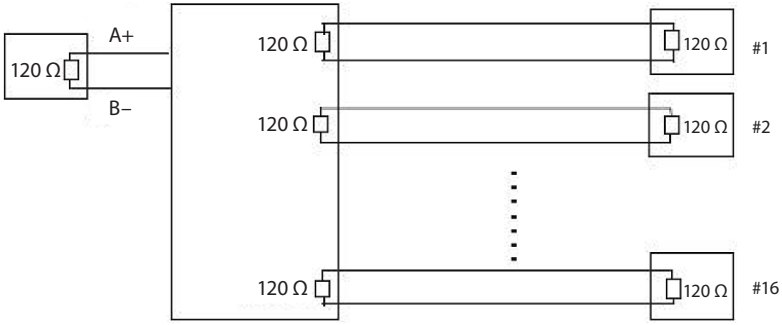
Although the star-shape connection method is commonly used, it does not satisfy the requirement of the RS-485 industry. This architecture can lead to problems such as signal reflection, uncontrollable or self-running cameras, and anti-jamming inability with devices that are far away. In the star-shaped connection, the termination resistors are usually placed in the two devices that are farthest apart (see figures below).



Star-shaped connection

Signal transmission in the star-shaped architecture can be greatly improved by adding an RS-485 distributor. This product effectively changes the star-shape connection to one that satisfies the requirement of the RS-485 industry standard. See the diagram below.

APPENDIX B: RS-485 BUS CONNECTION



Star-shaped network with an RS-485 Distributor

FAQ of RS-485 Bus

Fault	Probable Cause	Solutions
The camera will perform a self check but cannot be controlled.	The address or baud rate is not configured appropriately in the camera or controller.	Configure the camera address and baud rate to match in the controller and the camera.
	RS-485 +/- are connected incorrectly.	Correct the RS-485 wiring connections.
	Wiring is disconnected	Fastening the wire
	RS-485 wire is broken	Change the RS-485 wires
The camera can be controlled but does not operate smoothly.	Loose wire connections	Fasten the RS-485 wires correctly
	One RS-485 wire is broken	Change or repair the broken wire
	Controller and camera are too far away	Add terminal matched resistance
	Too many devices are connected to the network	Add an RS-485 distributor.

APPENDIX C
24 Vac Wire Gauge and Transmission Distance

The following table shows the recommended maximum distance adopted for the different wire sizes when the 24 Vac voltage loss is less than 10%. For the AC driven device, the maximum voltage loss rate allowable is 10%. For example, for a device with the rating power of 80 VA which is installed 35 feet (10 m) from the transformer, the minimum wire gauge required is 0.8000 mm.

Table 5. Table of wire gauge standards

Distance: ft (m)	Wire Gauge (mm)			
Power (VA)	0.8000	1.000	1.250	2.000
10	283 (86)	451 (137)	716 (218)	1811 (551)
20	141 (42)	225 (68)	358 (109)	905 (275)
30	94 (28)	150 (45)	238 (72)	603 (183)
40	70 (21)	112 (34)	179 (54)	452 (137)
50	56 (17)	90 (27)	143 (43)	362 (110)
60	47 (14)	75 (22)	119 (36)	301 (91)
70	40 (12)	64 (19)	102 (31)	258 (78)
80	35 (10)	56 (17)	89 (27)	226 (68)
90	31 (9)	50 (15)	79 (24)	201 (61)
100	28 (8)	45 (13)	71 (21)	181 (55)
110	25 (7)	41 (12)	65 (19)	164 (49)
120	23 (7)	37 (11)	59 (17)	150 (45)
130	21 (6)	34 (10)	55 (16)	139 (42)
140	20 (6)	32 (9)	51 (15)	129 (39)
150	18 (5)	30 (9)	47 (14)	120 (36)
160	17 (5)	28 (8)	44 (13)	113 (34)
170	16 (4)	26 (7)	42 (12)	106 (32)
180	15 (4)	25 (7)	39 (11)	100 (30)
190	14 (4)	23 (7)	37 (11)	95 (28)
200	14 (4)	22 (6)	35 (10)	90 (27)

APPENDIX C: 24 VAC WIRE GAUGE AND TRANSMISSION DISTANCE

Table 6. Wire Gauge Standards

Bare Wire Gauge (mm)	American Wire Gauge AWG	Cross-sectional Area of Bare Wire (mm^2)
0.750	21	0.4417
0.800	20	0.5027
0.900	19	0.6362
1.000	18	0.7854
1.250	16	1.2266
1.500	15	1.7663
2.000	12	3.1420
2.500		4.9080
3.000		7.0683